

Notice of Allowability

Application No.

09/894,230

Applicant(s)

KO ET AL.

Examiner

John Ruggles

Art Unit

1756

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to the 7/31/06 BPAI Decision.
2. ☒ The allowed claim(s) is/are 16-24 and 37-39.
3. ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some* c) ☐ None of the:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

* Certified copies not received: _____.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.

THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

4. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.
5. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
- (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached
- 1) ☐ hereto or 2) ☐ to Paper No./Mail Date _____.
- (b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date _____.
- Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).
6. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

- | | |
|---|--|
| 1. <input type="checkbox"/> Notice of References Cited (PTO-892) | 5. <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 2. <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 6. <input type="checkbox"/> Interview Summary (PTO-413),
Paper No./Mail Date _____. |
| 3. <input type="checkbox"/> Information Disclosure Statements (PTO-1449 or PTO/SB/08),
Paper No./Mail Date _____ | 7. <input checked="" type="checkbox"/> Examiner's Amendment/Comment |
| 4. <input type="checkbox"/> Examiner's Comment Regarding Requirement for Deposit
of Biological Material | 8. <input type="checkbox"/> Examiner's Statement of Reasons for Allowance |
| | 9. <input type="checkbox"/> Other _____. |

DETAILED ACTION

Response to the 7/31/06 BPAI Decision

In the 7/31/06 decision by the Board of Patent Appeals and Interferences (BPAI), the previous rejections over the prior art of claims 16-24 and 37-39 were reversed.

Therefore, these previous rejections are now withdrawn in view of (A) the 7/31/06 BPAI decision and (B) the examiner's amendment shown below.

EXAMINER'S AMENDMENT

An examiner's amendment to the record appears below. Should the changes and/or additions be unacceptable to applicant, an amendment may be filed as provided by 37 CFR 1.312. To ensure consideration of such an amendment, it MUST be submitted no later than the payment of the issue fee.

Authorization for this examiner's amendment was given in a telephone interview with Michael Gencarella on 8/16/06.

The application has been amended as follows:

IN THE SPECIFICATION (as previously amended on 6/6/03 and 12/22/03):

Amend the title as follows: ~~--APPARATUS AND METHOD FOR ARGON PLASMA INDUCED ULTRAVIOLET LIGHT CURING STEP FOR INCREASING SILICON-CONTAINING PHOTORESIST SELECTIVITY--~~.

Amend the original abstract as follows: ~~--Provided is [[a]] A method and apparatus for increasing [[an]] etching selectivity of a developed silicon-containing photoresist material layer on a non-silicon containing photoresist layer on a substrate. An exemplary method initiates with~~

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~~providing a substrate with a developed photoresist layer.~~ The developed silicon-containing photoresist layer ~~on the substrate~~ includes polymer chains containing silicon. Next, the ~~substrate~~ and developed silicon-containing photoresist layer and uncovered portions of the non-silicon containing photoresist layer are exposed to an ultraviolet (UV) light, where the UV light emanates from a UV generating agent, such as neon, xenon, helium, hydrogen, or krypton gas in an inert gas (e.g., argon, etc.) plasma. A top portion of the developed silicon-containing photoresist layer is then converted to a hardened ~~[[layer]]~~ layer, where the hardened layer is created by cross-linking the polymer chains containing silicon and the cross-linking is activated by the UV light. ~~[[Next]]~~ Next, an etch ~~may be~~ is performed on the uncovered portions of the non-silicon containing photoresist layer and the substrate using the hardened layer.--.

At page 11 in the last line, change “silicon-acetyl (Si-CH₃) bonds” to ~~--silicon-acetyl (Si-CH₃)~~ silicon-CH₃ bonds--, in order to be consistent with these bonds recited by instant claim 17 lines 2-3, as previously amended on 6/6/03.

At page 12 line 15 (which is the first line in the last paragraph on page 12), change “diagram 134” to ~~--diagram 134~~ of Figure 3--, since reference number 134 is found in Figure 3.

IN THE CLAIMS (as previously presented in the amendment filed on 7/12/04):

In claim 16 line 6, change “exposing the substrate and the developed photoresist layer to ultraviolet (UV)” to ~~--exposing the substrate and the developed~~ silicon-containing photoresist layer and uncovered portions of the non-silicon containing photoresist layer to ultraviolet (UV)--.

In claim 37 lines 3-4, change “applying a first non-silicon containing photoresist layer over a substrate; applying a second silicon-containing photoresist layer over the first photoresist”

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to --applying a first non-silicon containing photoresist layer as the bottom photoresist over a substrate; applying a second silicon-containing photoresist layer as the top photoresist over the first photoresist--.

In claim 37 line 7, change “and excimer laser” to --and an excimer laser--.

In claim 37 line 16, change “by cross-linking the polymer chains” to --by cross-linking [[the]] of polymer chains--.

Allowable Subject Matter

Claims 16-24 and 37-39 are allowed.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to John Ruggles whose telephone number is 571-272-1390. The examiner can normally be reached on Monday-Thursday and alternate Fridays.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mark Huff can be reached on 571-272-1385. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

jsr



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